FYP Ideas - Fall 2023

1. FYP Title

FYP Highlights (Description)

2. SeamZo

Blockchain based social media platform integrating nfts for the users posts. the user can buy sell or post any digital content.

3. Go-Cart

[Go-Cart] is an automated shopping cart with the aim to make shopping a hassle free and simple experience for both the consumer and the shop employees by utilizing a combination of IoT and AI. It will allow cashierless checkout using a collaboration of radio-frequency identification(RFID), barcode scanning and image recognition using deep learning, along with a cluster based specialized shopping recommendations system to provide artificially intelligent shopping assistance.

4. AR based Tactical Simulator

Augmented Reality based tactical training simulator for special forces. The simulation includes two different teams in various scenarios. Team members will communicate with each other using call outs, tagging in 3d space, and can view the location of their allies. Each member is part of the virtual arena connected to a single lobby. A lobby can also have observers analyzing the performance of players. A player can see a 3D or 2D view of the arena through their device. AR mesh generation will enable team members to share their 3D views. The simulator will cover different types of scenarios like rescue operations, eliminate target and bomb disposal etc.

5. Smart Salah

Activity recognition of prayer using smartwatch

6. Automated Knowledge Graph Construction for Large Document Collections

- Convert source data from document collections either structured or unstructured into RDF
- Design a Conceptual Model for the Knowledge Graph
- Populate and Visualize the RDF Knowledge Graph
- Publish the RDF as Linked Data
- Link with Potential External Datasets/Open Knowledge Graphs
- Query using SPARQL
- Create end user web application to browse and visualize the Knowledge Graph based Document collections
- Enable users to run complex queris in a user friendly manner

7. Fix your home accessories with single click

SmartFix is aimed to be a mobile application for smartly fixing your home appliances. It will provide accessibility and assistance to the people of Pakistan for finding laborers in their proximity with just a single click. It will also open up job opportunities for countless people all across the country. The application will be implemented using the concepts of Deep Learning and Computer Vision.

8. Digital Scoreboard and DRS for FAST cricket ground

Our first objective is to develop a digital score board for a cricket match similar to the one we see on our television screens. This digital board will provide information regarding the cricket match like team and player names, current/target score, wickets, overs etc. Our system will also show video feeds from different angles. Our second objective is to built a 3rd umpire system (DRS) for smart decision making regarding the match which will help in deciding runouts, no balls and bat edge. Our system will also calculate the speed of the ball.

9. Twitter Trend Analysis

A smart Web Application which will analyse the twitter trends and determine the sentiment of the tweet, bot activity in a trend, origin of the trend and will help to neutralize the propaganda. There are group of political Twitter accounts, commonly referred to as political propaganda bots. We have seen cases where these accounts are re-tweeting falsified information. Furthermore, these accounts all seem to be part of the same networks of other political propaganda bots, which allow them to promote content very quickly to real humans on Twitter.

10. Idea Market

We have the following propositions for this idea which are defined below:
- The project is a repository of ideas and people can come and buy it.
- In order to ensure that the product works, we will have a level of information shared.
- There will be free ideas for your project as a hook
- For some subscription x, you will be able to see some description of the idea. Only a selected part, like it is done on some sites where students' assignments are uploaded. You will be shown the architecture and technologies, the solution uses.
- In order to buy the idea, you will have to talk to the owner.
- On this site not just ideas are sold but also the solutions to some problems as well, which can also start the trend of collectibles in the algorithm domain. So, most students will then push themselves to make their own algorithms and post it here. So definitely having an impact on the research side and academia.

11. Business Automate insights

The main problem is that organization use excel sheets to store the data and they don’t have any centralized system for storing the data. They need to use data for taking business decision and enhance their profit as much as possible. Other problem is that now a day’s traditional ways are used such as Teradata and oracle. It requires millions of dollars to implement this and they use their own hardware and installation process. So technologies that we will be using are open source and we will be implementing on our laptop by increasing ram and it can be scaled up or down depending on the size of data. Then we will be using this concept to store their data in DWH/data Lake. Data Lake will be helping in storing vast amount of data giving a 360 view of their data to provide meaningful insights helping a business make decisions in order to be profitable.

12. DocExpress(Andriod) & Web Apps (Revised)

Tracking and searching of official documents using mobile devices

13. Plant Disease Detection System

We will make an android app that will take pictures of leaves and process them using digital image processing and analyze it using deep learning and then detect either the plant has the disease or not and then tell which is it .

14. Pest recognition using deep learning

The aim of the project is the recognition of crops pest using deep learning and image processing.

15. Aniketos: System vulnerability detector

Aniketos will automatically scan the system and will identify the system's vulnerabilities. It will rate the security of the system on the basis of internal and external factors and will grade the security of the system.

16. Automated Penetration Testing

We will automate traditional penetration testing methodology which involves scanning, exploitation and report generation. Through this project we will not only save the the human involvement in the process but also the resources like time and money.

17. ThreatGator

Cyber threat intelligence (CTI) is an area of cybersecurity that focuses on the collection and analysis of information about current and potential attacks that threaten the safety of an organization or its assets.
Cyber threat intelligence sources include open source intelligence and social media intelligence.
A Threat Intelligence Platform (TIP) is a technology solution that collects, aggregates and organizes threat intel data from multiple sources and formats.
Our proposed TIP's features would include
1. Aggregation of intelligence from multiple sources
2. Curation, normalization, and enrichment of data
3. Filtration and prioritization of threats
4. Correlation based on IOCs in STIX format and their visualization

18. Insider Threat Detection

The Insider Threat Detection system monitors the activities of an insider on a system. It will monitor different user activities including but not limited to application usage, data access/movement, IP tampering, privilege escalation etc. All the data regarding these activities will be sent and stored on a server where it can be analyzed. Furthermore, the monitoring application will be run under special conditions in which it cannot be detected or interfered with by the user whom it is monitoring.

19. AD-APT - Artificially Determined Advanced Persistent Threats

AD-APT's main goal is to determine key characteristics related to the TTPs,IOCs and tools from varied APT sources by automatically crawling for information on a regular basis and classifying the sources as APT relevant using machine learning.

20. AI Based Facial Recognition Authentication System With Anti Spoofing Capabilities

We intend to design a system that will take live video from a camera. A person will stand in front of the camera and the camera will recognize the person using facial recognition AI techniques. The system will also include anti spoofing methods such as check if the persons eye is blinking, check wether a video or picture of the person is being shown to the camera and use Anti-spoofing AI models such as AENet. There are already some Anti-spoofing datasets available on the internet. We hope to survey these multiple techniques and implement some as well and create a complete automated authentication system. Such a system can be used in a university or an organization for authentication purposes.

21. Knowledge-based Conversational Agent

Our project consists of an open-dialog language model like Google's Meena but considers factuality in addition to specificity & sensibility when generating human-like responses.

22. DeepDub

Making videos more accessible to people who speak different languages, using deep learning and image processing techniques.

23. DeepScene

Generating an animated scene from a script

24. GreenHealth Passport

For our final year project, our idea was to create a digital health pass. It is a solution designed to give you full control of your health records and data. you can choose voluntarily what information to share and where to share it. It will give organization's staff and regular citizens to manage and share their personal health information in a privacy preserving way
it will also provide a solution for organizations to verify an individual's health credentials through a digital wallet.

25. Speech Enabled Grocery Application with Smart Categorization

It is an application that enables users to order groceries online. However, what makes this app unique is that it enables people to order groceries using their speech (Urdu or English), categorizes edible items that would be safe or unsafe for the user and also makes a user profile for further saving the user's most frequent ordered items. Through this application we want to work further on improving Urdu Speech Recognition.

26. Cleanify: Optimization of Waste Collection Tasks in Smart Cities

Project domains: Artificial intelligence, machine learning and data visualization.
In this project, we will deal with the problem of poorly managed waste collection from urban waste dumping sites. Currently it is a common sight to find large piles of garbage in residential areas, parks and bodies of water due both to poor waste collection management and lack of compliance to waste-dumping rules by the population. As this causes a large number of waste-related illnesses as well as environmental pollution, there is an urgent need for a smart solution for waste collection. In this project, we will develop a waste monitoring system that uses, among other data, images of dumping sites to determine how urgently a waste collection vehicle needs to be dispatched to the area. Data from the monitoring system will feed into an intelligent decision making module which will run optimization algorithms to provide the waste management authorities with an optimized waste collection route and schedule that minimizes cost while prioritizing timely waste collection. The decision making module will be integrated with a web-based management portal that will perform several functions, for example, allow the authorities to schedule waste collection, visualise incoming data from dumping sites, and decide optimal bin placement. In addition, it will include functionality for urban residents to report illegal dumping so that illegally dumped waste can be promptly cleared up. We will aim to produce a good quality research publication from this project.

27. AttackHerald: An early warning system for malware attacks

Aim is to predict cyber attacks generated by malware before they actually materialize, so that they can be prevented from occurring instead of being flagged after they have occurred. Malware-generated cyber attacks include distributed denial of service, ransomware attacks, and financial information stealing. Before a piece of malware launches an attack, it is likely to engage in some pre-attack behaviour in preparation for the attack, for example contacting a malicious control server. This pre-attack behaviour can be observed on infected hosts or networks as an evidence trail pointing to possible upcoming attacks. The goal of this project would be to first analyse a large amount of malware data from varied sources to confirm that pre-attack behaviour exists, and then develop an attack prediction mechanism that monitors a host or a network for such suspicious behaviour in order to predict an attack for timely prevention.

28. AuxVision

Our project aims to support the visually impaired by enabling them to perceive their environment and allowing them to navigate without any external assistance.

29. Parking reservation system

An online parking reservation system which uses image recognition of a license plate to automatically book and unbook a parking spot.

30. Accident Detection and Emergency Response System (ADERS)

The system is to provide support in case of car accidents. The accident will be sensed through sensors present in smartphones, and relevant authorities will be informed about the exact location of the accident. Emergency contacts, and the people using this application in a certain radius will also be informed of the accident. The authorities will be provided with the shortest route to prevent any delays.

31. Intelligent Tourist Guidance System

Web/Mobile app which uses ML/NLP techniques to deliver an intelligent tourist guide

32. MILDDA

Lung diseases result in 3 million deaths every year. In Pakistan 55,521 people die annually due to respiratory diseases. Everyday a radiologist looks at hundreds of x-rays and CT-scans. Each image takes around 10 minutes to be read carefully. The scans are then sent to the doctors who read them again and they give a detailed final report. This process takes a lot of time and then the critical cases take even longer to be identified which results in delayed treatment. Since late December 2019, the coronavirus disease (COVID-19) has been causing serious lung damage and breathing problems. In addition, pneumonia, a form of lung disease can be due to the causative virus of COVID-19 or may be caused by other viral or bacterial infection. Hence, early detection of lung diseases has become more important than ever.
We are making a system that detects lung diseases such as COVD-19, pneumonia, lung cancer and tuberculosis. The radiologists can upload medical images such as CT-scans and X-rays. The images are processed and cleane first, then they will be passed through a convolutional neural network (CNN) which will then classify the images into diseases. The probability of a given disease will also be shown to give an accuracy measure. This system will help point out the critical cases in a particular class/disease. This system will also make the detection of COVID-19 faster. This system will be there to help the doctors and radiologists as they will make the final decision for the patient.

33. Scribbling Speech

An application to draw 2D animated drawings with speech input using Natural Language Processing and Recurren Neural Networks targeted for kids for educational and entertainment purposes.

34. 4D Navigation with AR for Indoor

A user will be guided from its current location to the desired destination inside of a building.

35. VR Fitness

A VR app to provide an immersive and fun exercise at home or outside.

36. Explainability of Neural Networks

Explainability in machine learning is a huge problem in today's modern world. Image classification techniques tend to act as a black box, not providing any information about what made them arrive at a particular decision. Our project is research based and we'll try to evaluate a couple of techniques to identify which is trained better to break the black box and know what is happening behind the scenes. We'll be focusing on two image classification techniques i.e. LRP (Layer-wise Relevance Propagation) and CAM (Class Activation Map) which propose a general solution to the problem of understanding classification decisions by pixel-wise decomposition of nonlinear classifiers. These techniques introduce a methodology that allows to visualize the contributions of single pixels to predictions for multilayered neural networks and identifying regions in images which lead to classification decisions. Throughout our project, we will try to test different datasets and try to evaluate which out of LRP and CAM works better at image classification.

37. Baby Neuron

Classroom/Learning environment for children using 3D models and VR

38. WicketToWicket: A tool that performs predictive analysis on cricket matches using deep learn

The aim of this project is to replace the Hawkeye technology by predicting the ball trajectory from three different positions i.e. from bowler's bowling action, ball swing and seam. It will also suggest bowler's top bowling strategies, batsman's top batting strategies and come up with the most effective combination of players which will help in team selection for any team. It will also predict maximum target score and winning chances of a team in a match, and generate cricket highlights on demand.

39. Hospital Aid

HospitalAid is a project aiming to facilitate hospitals by using their live camera feed to monitor the hospital and detect certain gestures/events/actions and signal the appropriate person. It is an industry-based project approved by the hospitals and would be helping in implementation of SOPs alongwith other medical procedures.

40. Medi Eye

Medi Eye will use live camera feed to monitor the on-going activity in medical institutes. It is an industry-based project approved by Maryam Memorial Hospital, which will enable the hospital's managment to successfully detect any suspicious/threatening activity in the institute's premises.

41. Privacy Preserving Crypto HD Wallet

Privacy Preserving Crypto HD wallet is a crypto currency wallet that aims to provide security, privacy, and full control to its users. It is an Research and Development Project.
Motivation:
- Few to none Pakistani crypto-wallets in market
- Crypto-Exchanges aren’t very reliable. Over 50% of exchanges have been compromised in the past.
- Crypto-currency and blockchain is very future oriented.

Innovation:
In today’s date, most of the crypto-wallets have access to your private key to manage transactions on your behalf. This makes the location of your wallet known to them and hypothetically, they can transfer your funds to their own accounts pretty easily.
We have proposed a wallet based on Hierarchical Determinism. This will ensure the integrity of a person’s wallet and all of his transaction. In this scenario, only the owner of a wallet will have the access to his wallet and his transactional history.

42. FYP Automation

This project is web based and Android based in which student that are doing FYP will register and tell about their group members, project details and supervisor. Then system will create different FYP panels and each panel will be assigned to different student groups throughout the year. After that each group has to submit report about their project to their supervisor on different times. If they don't submit it on time then reminder mail will be send to all group members and if they submit late then late notification will be send to supervisor. After that system will give evaluation form to FYP panel members for Mid and Finals of FYP-I. Similarly, for code evaluation students will submit it and code evaluation form will be given to non-Phd teacher. After evaluation teachers will upload marks and system on the bases of marks will generate Students grade. Similarly, same process for FYP-II.

43. Sign Assistant

We want to make a virtual assistant that will communicate in sign language to assist the deaf/mute people. The basic functionalities of our assistant includes Searching over the internet, sending Emails, setting Reminders, using Camera and opening and closing of Applications. Other than that, the distinct feature of our assistant is that it will convert any given Audio (URL) into sign language.

44. Personal Voice Assistant For Urdu Language

Voice assistants or personal voice assistants are programs using natural language processing (NLP) and speech synthesis to perform certain tasks on the user command. Currently, they have been a major part of our smartphones, computers for the past few years, If you are iPhone user certainly you are using Siri, or if you are an android user you know your google assistant. So, we built our own Personal Assistant for Phones.
Functions:
The system provides all the below stated functions.
- Opening and closing an application
- Altering system brightness, volume
- Accessing bluetooth, WIFI
- Dial calls and send sms

45. Urdu Audio Miner

Audio mining application can be used to search audio or video content that contains speech. Typical applications include searching large audio/media archives, where little or no information is available that describes the audio content. This could be used, for example, to retrieve relevant clips for a news story from a large video archive.

46. Intelligent Assistant

We aim to build an app that takes a pic as input and returns a story from that picture by generating captions using DIP and deep learning and converts that picture story into speech too in local languages like Urdu. Also this app will assist a blind man by guiding him about his surroundings by speech generated from the details that will extracted from the imagery being captured live via camera.

47. Report to Powerpoint Slides

A web app where User uploads a Document and the User gets a PowerPoint Presentation Slide with key text and images in return

48. Route and Safety Awareness using android app (RSA)

An AI-based app that will assist the driver with the road signs, boards that are just across by.
This project has three phases:
In 1st phase, Real-Time video would be captured by their surroundings and that will be given as input to the Android app, and here Preprocessing would be performed on Each Frame of Video.
In the 2nd phase in which deep learning and Image Processing Algorithms would be implemented that will detect the Direction Signs, Boards, Safety Signs.
In the 3rd phase, It will Classify between that Sign, Board using deep learning algorithms.
In the 4th phase, it will read text written on Boards, and convert that sign image to text then it will convert that text into audio that the driver can listen to using the app.

49. TravelBuddy (AI Based travel guide)

A mobile based travel application which includes functionality like translating banners/signboards (Urdu to English), Safety Module for travelers, Weather Updates, Travel Packages details, Nearby services details (hotels, malls, markets etc) and TravelBuddy (a social platform for travelers). It will also have an interactive chatbot which resolves queries about services provided in the app.

50. MimicBot

Voice cloning and Text to Speech Synthesis is a problem that has applications in a wide range of scenarios. They can be used to read out pdfs loud, help the visually impaired to interact with text, make chatbots more interactive etc in any voice. MultiSpeaker Text to Speech synthesis refers to a system with the ability to generate speech in different users' voices. We will work on mimic bot that can take input as text from the user that user want to speak and audio that user want to clone.

51. Personality Analysis using Social Media Profiles.

Today, social media provides ample information and entertainment to its users. Using this platform people can share their opinions, ideas through posts (tweets), pictures (Instagram) videos etc. in the form of micro-blogging across all the global boundaries.
People often try to portray their 'ideal' image on these web pages in order to gain a trusted and loyal following.
Thus everyone has an online personality, created by what they share on the internet. This personality is true for many people but in a few cases this may not be the same as the real one.
The motivation of this project is to identify the personality traits of an individual by using his/her social media profile. It will mainly focus on Twitter accounts as it is very popular, and people reveal more about their personality through tweets than Instagram or Facebook. Thus our target is to teach 'how to analyse a Twitter Biography', 'what are the different types of personality stereotypes' etc. that can be used for various purposes like marketing, research, etc.

52. Explainable AI for Hate Speech Detection for Urdu

Hate speech is a challenging issue plaguing the online social media. While better models for hate speech detection are continuously being developed, there is little research on the bias and interpretability aspects of hate speech. So, the purpose of this project is not to just classify text as hate speech or not, but also explaining the reason that why it is hate speech.

53. Urdu OCR

The idea is to make a useful tool as Android app and web application to convert image text into editable text which can be edit and share at any platform. It will also reduce the size of the data as image text data takes great memory as compare to textual data.

54. Smart helmet

We will be developing a helmet that will detect the movements of vehicles through a rare camera and will tell the rider whether he can take a turn or not. This is idea is based on AI and tools we will be using are raspberry pi and python.

55. Voice Control Home Automation for Pakistan in Urdu

Home automation allows us to control household electrical appliances like light, door, fan, AC etc. Lot of systems are developed for English speech, but this is of it's first in nature will be made in Urdu language for Pakistani community.

56. Voice Controlled Self Driving Car

We will first create a self driving car that can avoid obstacles and have other functionalities to drive by its own. After that, we will deploy a voice controlled model on top that will be used for performing actions like stop, start, turns, switch on lights, play music, etc using urdu (some additional english words may also be added)

57. Covitector (COVID 19 DETECTION THROUGH COUGH)

This is an industry project (Research and Development) where we will build a platform which will detect if one has covid through the means of acoustic (forced cough recording on cell phone)

58. Secure Ballot

Our project is an E voting mobile application completely based on block chain technology. It will allow the user to cast the vote. Its target audience is the overseas citizens who are unable to vote because of physical voting system.
It will be a decentralised system which makes it more secure and reliable. It will also count the votes, show results and make sure that basic rules of the voting system are not being violated.

59. Web Application Firewall (WAF)

Web Application Firewall(WAF) is a web based firewall that runs as a reverse proxy in front of web applications to monitor, filter and block out the packets as they travel to and from a website/web app. Running as a network appliance, server plugin or cloud service, the WAF inspects each packet and uses a rule base to analyse Layer 7 application layer logic and filter out potentially harmful traffic that can facilitate web exploits.
It analyses Hypertext Transfer Protocol (HTTP) requests and applies a set of rules that define what parts of that conversation are benign and what parts are malicious.

60. Decentralized social media (hashbook

A decentralized social media where user gets paid for their data

61. Intelligent Video interview based pernality assessment

the video and audio based processing is applied to automatically assess the personality of person giving interview.

62. Video Lecture Summarization / Lecture Summarization from Video Lectures

During Covid times, students faced a issue that if they have to revise a lecture; they have to listen whole 1/1.5 hours video lecture again. Keeping this issue in front, this idea generated that why not make a software which automatically generate a summary from a video lecture and also generate notes for the student. So, student don't have to listen whole lecture again. He/she just have to read that summary and notes for revisiting the lecture.
So, the project is a online web based tool, which will generate summary (from audio and video) and notes from video lectures for a student.

63. Application to Monitor the Tree Plantation

The app will not only keep the tracking record of trees, but will also monitor their growth, it will also display species information of tress, and will keep a track record for the maintenance taken for the tress.

64. e-Campus

e-Campus aims to make transactions within the university ecosystem cashless by implementing a campus-wide blockchain based payment solution that benefits faculty, staff, parents and students alike.

65. Overhaulin' - Blockchain-Based Car Auction System

Overhaulin' is a blockchain-based car auction system that will help facilitate customers looking to buy or sell a car. The maintenance/accident log of the car will be stored to help customers verify the repair history of the car. Customers will also be facilitated through a car recommendation system, to cater to their unique needs.

66. Chatbot

We will be developing chatbot, just like an Ai assistant, which will be trained on dataset to solve queries regarding the admission procedure anr all admission related queries of FAST NU that can be in English or in roman urdu.

67. Hate Speech Inspector

A data analytics app that will help visualize the hate speech containing Islamophobia, Racism, and Sexism on Twitter

68. First aid administration assistant

Using AR,Ai and dip, we will create an application that will assist unequipped first aid responder

69. Aud-Able

Helping the deaf community by translating the Pakistan Sign Language(PSL) from video into text form, so they can interact with people without any hindrance.

70. Medicine detection for visual impaired people

Android application which will detect the name and description of the medicine after scanning it using camera.

71. AR Multiplayer Game

A two player augmented reality racing/shooting game will be implemented which can be played on a smartphone.

72. Swari

The current ride hailing service is extremely centralized. Central authority has all the control and access to all the data. Block chain due to its immutability explores the possibility of decentralized application in ride hailing service. In this regard we explore smart contracts to build and deploy functionalities such as fare calculation. The idea was to create an efficient system for both drivers and the passengers for their profitability. An effort to bring smarter transportation for society.

73. Online Digital Advertisement Marketplace (ODAM)

We are going to automate the the on-road digital advertisement boards using IoT based Technologies. We will provide web and mobile applications that will ease the process of changing the advertisement from a remote location. The dynamic billing shall be implemented using the crowd detection algorithms.